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Incidence Analysis of Public Support to the Private Education Sector in Côte d'Ivoire*

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Abstract. This study analyzes the equity effects of public subsidization of private schools in Côte d'Ivoire, updates previous analyses, and attempts to assess how efficiently public spending is targeted. The subsidy per student in private (and public) schools increases at higher quintiles. Students from families in the highest quintile receive more than twice the subsidy received by students from families in the lowest quintile, compared with four times more in the case of students attending public schools. However, the subsidy system is progressive as there is a clear tendency for the share of family education expenditure covered by subsidies to decline at higher quintiles. This element of progressivity is stronger in the case of private school attendance.

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Introduction

In 1997/98 the number of students enrolled in Côte d'Ivoire's educational institutions stood at 2.4 million, compared with 1.9 million in 1991/92 and 2.1 million in 1994/95. The gross primary enrollment (GPE) ratio had been increasing from the 1950s to the 1970s, peaking at about 77 percent in the early 1980s. Thereafter, it slowly decreased and by 1996/97 it stood at about 72 percent (Ministry of Education 1997a); it was higher for boys, at 82 percent, compared with 61 percent for girls. Likewise, the gross secondary enrollment (GSE) ratio increased through the 1960s and 1970s, with small increases in the 1980s. By the late 1980s and early 1990s, it had stabilized, even declining slightly (Demery and others 1996). In 1996/97 the GSE ratio stood at 28 percent (36 percent for boys and 20 percent for girls). Finally, between 1974 (when the University of Côte d'Ivoire was established) and the early 1990s, tertiary-level enrollments (which include students in university and tertiary technical institutions) increased five-fold. This increase accelerated in the 1990s. Close to 100 percent of tertiary institution students in Côte d'Ivoire come from families in the top quintile of the income distribution. In 1995 gross enrollment ratios were lower for girls compared with boys (60 versus 79 percent for primary, and 24 versus 38 percent for secondary), the poor (51 percent for the lowest quintile versus 99 for the top quintile for primary, and 12 percent for the lowest quintile versus 65 percent for the top quintile for secondary) and in rural areas (63 percent versus 92 percent in urban areas for primary, and 13 percent versus 54 percent for secondary).

The education sector in Côte d'Ivoire suffers from high dropout rates. By age 7, almost half the children are not enrolled in schools. Two out of three children in urban areas and four out of five in rural areas work full or part time (World Bank 1999). Indirect (but strong)

evidence of high repetition rates, as well as poor internal efficiency, can be found in the number of years needed to complete different levels of education. For example, it takes 8.9 years to complete primary school (expected 6), 5.6 years for lower secondary (expected 4), and 7.5 for the baccalaureate degree (expected 3) (World Bank 1995). However, repetition rates are much lower in private religious schools, compared with private secular and public schools.

Literature Review

Research on the distributional impact of public subsidies for education (recurrent expenditure net of costs recovered through fees) originates in the United States (see, for example, Hansen and Weisbrod 1969). These studies conclude that poor families finance the education of children of high-income families. That is, net subsidies for higher education are regressive. Research from household surveys using unit cost data and information on publicly subsidized education in nine African countries concludes that the education subsidy system is progressive, but poorly targeted. In Côte d'Ivoire (as well as in Guinea, Madagascar, South Africa, Tanzania and Uganda), the poorest 20 percent gain about 20 percent of the primary education subsidy, about 10 percent of the secondary education subsidy and a minimal percent of the tertiary level subsidy (Castro-Leal and others 1999). Recent research by Li, Steele and Glewwe (1999) provides similar results. In Côte d'Ivoire (as well as in Nepal, Nicaragua and Vietnam), the richest 20 percent of the population receive more than 30 percent of all public education expenditure.

Very little research has been carried out on private school issues in African countries. A notable exception is Tanzania. Reversing policies of restricting private secondary education, the

government of Tanzania in the mid-1980s supported the rapid expansion of the non-government sector in response to high excess demand. However, the new policies had little impact on student learning or school effectiveness, and at the same time resulted in widening social inequities and increased competition among schools for teachers and school heads. The findings suggest a possible need to refine policies, through selective subsidies to low-income students and to schools that offer high-value added education (Lassibille and others 1998).

In analyzing the impact of public spending for public and private education, the equity concern is the main focus of this study. The equity concern has also been the focus of a number of studies on the distributional impact of government spending for public schooling (Hansen and Weisbrod 1969; Pechman 1970; Mehmet 1978; van de Walle and Nead 1995; Antoninis and Tsakloglou 2001) using benefit incidence analysis. However, there have been few studies analyzing the equity effects of public subsidies for private schooling.

Earlier studies (Meerman 1979; Selowsky 1979) using benefit incidence analysis showed that public costs per household (as a proxy for benefits received) for students in assisted schools are pro-poor for primary education, pro-middle income for secondary education and strongly pro-rich for post-secondary education. The explanation for observing such a pattern is that poor households had more children in primary education and, therefore, benefited from utilizing the system. However, as the enrollment from poor households decreased for higher educational levels, the poor were less likely to benefit (Yang 2002).

Recent evidence is available from some developing countries (Selden and Wasylenko

1992). For Indonesia, the analysis of the distribution of subsidies among different expenditure quintiles shows that spending on primary education tends to be pro-poor while spending on higher education is clearly less beneficial to the poor (Lanjouw and others 2001). For Malawi, secondary and higher education are highly pro-rich with the richest quintile receiving 58 percent of all public subsidies for higher education (Castro-Leal 1996). In Ghana, the results indicate that the distribution of public spending for primary education is pro-poor, while for secondary and higher less so (Demery and others 1995). However, after controlling for demographic characteristics (such as number of school age children in each quintile), primary education is less pro-poor.

This study contributes to the literature by analyzing the poverty impact of public subsidization of private schools in Côte d'Ivoire, and updates a previous analysis by Demery and others (1996). It attempts to assess how efficiently public spending is targeted to the poor in a large African country, by looking at who benefits from public expenditure on education in different income groups. Côte d'Ivoire has a large subsidy program for private school attendance (which can be considered as a sort of a voucher scheme, but more of an example of the state contracting out education services to the private sector).

Contracting Out Education

Côte d'Ivoire legislation provides the foundation for private sector participation in education on the principle that, while education is a public service, private institutions may be granted the right to offer that public service. In effect, the government is contracting out education services. Therefore, a favorable environment toward this end was created. Decree 97-

675 (1997) outlines the regulatory framework for private sector participation in education. Agreements with private secular and religious schools specify the per-student subsidy amount, registration requirements, reporting requirements, and other rights and responsibilities of private schools and the government. The specifics of the policies allow for the provision of subsidies to providers, as well as sponsoring "public" students to attend private schools. Private schools are either "authorized" or "chartered/associated." Only the latter can attract subsidies for state sponsored students.

To benefit from public subsidies, the petitioning private establishment must satisfy the following criteria:

(a) Has been in operation for at least five years

(b) Has teachers certified for at least the last three years

(c) Has a maximum of 45 pupils per class

(d) Charges 40,000 CFA (Communauté financière de l'Afrique) Francs ($67) or less per year outside Abidjan, or 30,000 CFA Francs ($50) or less in Abidjan

(e) Has achieved at least national average success rates in examinations for the last three years of operation.

Private schools are funded both in cash and in-kind. How a school is funded depends on whether the school is primary or secondary and whether it is secular or religious. Primary schools are funded via subsidies. Secondary schools (secular as well as religious) are funded through the state sponsoring students to attend private schools. Therefore, this arrangement bears great similarity to a voucher scheme. However, vouchers imply the element of school

choice (Friedman 1955), which while not absent in the Côte d'Ivoire context, is less central. The arrangement is more like contracting out education services – or some form of mandate from the state (Murphy and others 1996; Savas 2000).

Subsidies vary according to fee level (the higher the fee charged by the school, the lower the subsidy) and region (schools in Abidjan receive less than those outside Abidjan) (World Bank 1999). For example, in 1995/96 the government paid the equivalent of $66 per student per year to religious schools outside Abidjan whose fees are less than $50, while it paid $41 per student per year in Abidjan whose fees are less than the equivalent of $83. Schools with fees above those levels do not receive any subsidy (World Bank 1999). The state pays private lower-secondary schools $200 and private upper-secondary schools $233 per student per year for students it sponsors to attend private schools.

Private Education Sector

It is estimated that in 1997/98 there were 432,277 private school students in Côte d'Ivoire. The share of private students in the education market in Côte d'Ivoire was 18 percent (12 percent at the primary level and 36 percent at the secondary level). The private sector share of enrollments varies across the different levels (Table 1). In 1997/98, 49 percent of students in private institutions were at the primary level, while 44 percent were at the secondary level and about 6 percent were at the tertiary professional and technical levels; none were at the academic level (Table 1). Between 1991/92 and 1997/98, the proportion of students in private institutions grew at annual rates of 9 percent for primary, 13 percent for secondary, and 490 percent for tertiary institutions (albeit from a very small base for the latter).

Table 1: Distribution of Private Education Students, 1997/98

Level	Number of Students	Distribution by Education Level	% of Students in Private Schools
Primary	213,634	49.4	11.8
Secondary	191,663	44.3	36.0
Tertiary (Professional)	27,980	6.3	100.0
Total	432,277	100.0	17.7

Source: INS, Statistical, Demographic and Social Directory (ASDS), 2002 [NOT IN REFS]

Public support to the private education sector grew constantly throughout the 1990s, with spending increasing from $25.7 million in 1993 to $38.8 million in 2001. At the same time, the number of recipients of public support in the private education sector increased from 116,210 in 1993 to 223,244 in 2001, an increase of 92 percent. For example, in 1999, at the primary level close to half of the pupils in private schools benefited form public support, compared to about one-third of the students at the secondary level and about two-thirds of the higher technical education students.

Private schools can be either secular (*laic*) or religious (*confessionnel*). Religious schools were the pioneers in private education in Côte d'Ivoire. At the primary level, religious schools dominate the private school market, while Catholic schools dominate the private religious sector at that level. The situation is reversed at the secondary level, where secular schools dominate the private school market. In total, there were 776 private primary schools and 294 private secondary schools in 1998-99. About 50 percent were secular and the rest religious. The majority of primary religious schools were Catholic (278 of 386, or 72 percent). On the other hand, most of the private secondary schools were secular (257 of 294, or 87 percent). About 78 percent of the private secondary schools were Catholic. About 60 percent were in Abidjan (Ministry of Education 1999).

Religious schools, and Catholic schools in particular, have the reputation of being the highest quality schools, as measured by exam scores. Students in some religious schools perform much better than the average. For example, in 1998, students from Catholic schools such as N. Dame Du Plateau, Notre Dame d'Afrique and St. Jean Bosco, achieved school leaving examination scores of at least 70 percent, compared to an overall average of 36 percent for all religious schools (Ministry of Education 1998). The higher apparent quality of religious schools is attributed mostly to the fact that they can afford to hire better teachers and acquire better teaching resources than other private schools, since they can top-up their fee and state funding with church funds (World Bank 1995).

Private school fees vary according to whether the school is religious or secular, where it is located, and the quality of education provided. Elite schools (such as French schools) have the highest fees. However, secular private school fees, even among "non-elite" schools tend to be high, ranging from $100-200 to well over $1,000. Religious school fees are much lower, ranging from a few dollars in rural areas to $166 in Abidjan. There are disparities in fees charged by religious schools run by the same religious authority depending in the financial resources of the school. Fees in wealthier religious schools tend to be higher than average, with the excess cross-subsidizing schools in poorer areas. Due to the large variation of fees across private schools, the per-student subsidy paid to private students ($200 or slightly more) exceeds the fees that many schools charge (World Bank 1999). However, there are many cases where the reverse is true.

In 1995, the population of Côte d'Ivoire benefited from $25 per capita in subsidies paid through the education system as a whole; the per capita subsidy for public schools was $24 and for private schools $1.20. However, education subsidies were unequally distributed across the population with urban areas benefiting with $36 while the benefit to rural areas was $16.50 (Demery and others 1996). Furthermore, subsidies favored higher-income families. The poorest quintile received a per capita subsidy of about $17 from their use of publicly subsidized education, compared to $43 going to the top quintile. This inequality applied to spending through both public and private schooling. Despite this pattern of education subsidies, education spending in Côte d'Ivoire, while poorly targeted, is generally progressive. The third dimension of inequality is due to gender differences. Overall, females gained only about one-third of total education subsidies, and even less in lower quintiles. On average, the per capita education subsidy to boys is almost twice that to girls (Demery and others 1996).

In 1997, the government of Côte d'Ivoire allocated almost $18 million for private school subsidies to 162,874 students (Ministry of Education 1997b). Of this amount, just over $15 million was dispensed. On average, each of the 104,510 primary school pupils (6,263 in secular and 98,247 in religious schools) benefited by about $47 ($43.50 for secular and $47.20 for religious school pupils). The subsidy benefit for each of the 58,364 secondary school students (48,103 in secular and 10,261 in religious schools) was $177.5 ($175.50 for students in secular schools and $187.50 in religious schools).

Data and Methods

The 1998 Enquête Niveau de Vie des Ménages, a nationally representative household survey in Côte d'Ivoire, is used to analyze the distributional aspects of public spending. From the raw file, an initial working file was extracted containing individuals of school age (6-30 years old). Information about characteristics of the head of household, the spouse of the head, as well as other household information was extracted and merged with the initial working file. The sample contains approximately 9,000 observations relating to family members of school age of whom approximately 5,100 attended school in school year 1997-98; of those, 4,560 attended public schools and 550 (or approximately 11 percent) attended private schools. Among those who attended school, 965 (19 percent) received some form of education subsidy, 836 (or 86.5 percent) going to public schools and 129 (or 13.5 percent) going to private schools.

The overall gross enrollment rate (for school age children 6-29 years old), was about 56 percent in 1997-98: 61 percent for boys and 50.5 percent for girls (Table 2). The gross primary enrollment rate was just over 70 percent (73 percent for boys and 66 percent for girls). About 57 percent of secondary school age children were attending school (66 percent of boys and 46.5 percent of girls), 25 percent of whom were still in primary school (28 percent of boys and 22 percent of girls). About 27 percent those over 18 years were attending school (32 percent of boys and 21 percent of girls), 14 percent of whom were still attending secondary school (17 percent of boys and 10.5 percent of girls). The above estimates confirm the reported high repetition rates in Côte d'Ivoire.

Overall school attendance varies between urban and rural areas, with 62 percent attending

school in urban areas (67 percent for boys and 56 percent for girls) and 49 percent in rural areas (53 percent for boys and 43 percent for girls). School attendance rates increase with family purchasing power. About 48 percent of children in the lowest quintile were attending school in 1997-98, compared to 52 percent in the 2nd quintile, 56 percent in the 3rd quintile, 60 in the 4th quintile and 65 percent in the highest quintile.

Table 2: Enrollment Rates by Level, Sex and Region and Income Quintile, 1997/98 (%)

	Male	Female	Total
Quintile (all levels)			
1st			48
2nd			52
3rd			56
4th			60
5th			65
Education Level			
Primary	73	66	70
Secondary	66	47	57
Tertiary	32	21	27
All levels	61	51	56
Urban	67	56	62
Rural	53	43	49

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages

Children attending private schools are more often in urban areas compared to children attending public schools (Table 3). More than 50 percent of children attending private schools are secondary or tertiary students compared to 34 percent of children attending public schools. Among the children attending private schools, 46 percent are girls, compared to 38 percent of children attending private schools. About 26 percent of children in private schools are in families in which the head attended a private school, compared to 9 percent of children in public

schools. Children attending private schools are found in families with much higher family income (as well as much higher household expenditure). Families whose children attend private schools also receive a much higher average education subsidy.

In the case of children attending public schools (Table 4), family spending on children's education increases with the family's spending power. Households in the top quintile spend on average about 10 times more per child for the education of children in the family than families in the lowest quintile. This differential is more pronounced in tertiary education (about 12 times) compared to primary and secondary education (about 8 times).

Table 3: Students Receiving Government Subsidies: Student and Family Characteristics, Private versus Public Schools

Student Characteristic	Public	Private
Sex (%):		
male	62.5	54.3
female	37.5	45.7
Urban/rural (%):		
urban	64.6	87.6
rural	35.4	12.4
Age group (%):		
<12	43.8	41.1
12-17	38.8	27.1
>17	17.4	31.8
Religion (%):		
Muslim	23.8	22.5
Christian	52.9	63.6
Other	23.3	13.9
Ethnic group (%):		
Akan	52.5	39.5
Other	47.5	60.5
Class in 1997-98 (%):		
Primary	66.3	48.1
Secondary	29.2	35.5
Post-secondary	4.5	16.4
Student status (%):		
Full-time	99.1	96.9
Evening, working student	0.9	3.1
Family Characteristics		
Mean total annual family wage income	2,606	5,490
Mean total annual family expenditure	2,022	3,570
Mean family annual education expenditure	215	476
Mean annual education subsidy	172	269
Sex of head (%):		
male	70.8	69.0
female	29.2	31.0
Education level of head (%):		
primary or less	38.5	34.0
secondary (some or completed)	37.8	26.4
more than secondary	23.7	39.6
Head attended private/public (%):		
public	90.7	73.6
private	9.3	26.4
N	841	133

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages

Table 4: Family education expenditure[+] per child, by total family expenditure quintile and level of education (public schools only), in $

Quintile	Primary	Secondary	Tertiary	All levels
1st	70	111	92	77
2nd	136	172	88*	144
3rd	160	309	272*	187
4th	307	374	386	340
5th	547	889	1,075	767
All (mean)	238	484	613	338
N	340	146	47	533

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages
* less than 5 observations; + some values on household education expenditure are missing

In the case of children attending private schools (Table 5), the overall family education expenditure per child is slightly more than double that of children in public schools. Otherwise, the distribution of family education expenditure per child across expenditure quintiles is very similar to that of children in public schools, with the education expenditure of families in the top quintile exceeding that if families in the lowest quintile by a factor of 8 to 1.

Table 5: Family education[+] expenditure per child, by total family expenditure quintile and level of education (private schools only), in $

Quintile	Primary	Secondary	Tertiary**	All levels
1st	158	245	91*	181
2nd	289	332	379*	317
3rd	760	912	-	827
4th	652	1,347*	898	917
5th	1,236	1,590	2,425*	1,450
All (mean)	615	902	869	750
N	42	29	11	82

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages
* less than 5 observations; ** Professional (technical) education institutions only as there are no private academic institutions; + some values on household education expenditure missing

Table 6: Government subsidy per child, by total family expenditure quintile and level of education (public schools only), in $

Quintile	Primary	Secondary	Tertiary	All levels
1st	69	114	70	75
2nd	78	130	189	97
3rd	142	172	327	155
4th	138	224	454	206
5th	305	316	398	325
All (mean)	129	208	355	173
N	545	223	68	836

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages

The subsidy amounts in Tables 6 and 7 were calculated as follows: (a) the relevant population was ranked by household expenditure; (b) the population was divided into expenditure quintiles; (c) the expenditure amount going to each quintile for each education level, as well as the number of children in each cell was calculated; (d) the expenditure amounts were divided by the number of children in each cell. The same methodology was used in calculating the family education expenditure amounts in Tables 4 and 5.

For those attending public schools (Table 6), the subsidy amount per student increases steadily as we go to higher expenditure quintiles. Students from families in the highest (5^{th}) quintile receive four times more than families in the lowest quintile. This finding is more pronounced in students in tertiary (professional) education. On average, each student receives about $173 per year. For those attending private schools (Table 7), the subsidy per student increases but the increase is less pronounced. Students from families in the highest expenditure quintile receive just over twice the subsidy received by students from families in the lowest quintile. However, the subsidy amounts going to students from families in the 2^{nd}, 3^{rd}, 4^{th} and 5^{th} quintiles are of similar magnitude. On average, each student going to public schools and are subsidized receive approximately $270 per year. Overall, the allocation of subsidies seems to be

more equitable in the case of children attending private schools compared to those attending public schools.

Table 7: Government subsidy per child, by total family expenditure quintile and level of education (private schools only), in $

Quintile	Primary	Secondary	Tertiary**	All levels
1st	126	195	33*	147
2nd	201	374	239	261
3rd	360	266	350*	308
4th	175	803	475	309
5th	296	311	469*	322
All (mean)	219	360	215	269
N	63	46	21	129

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages
* less than 5 observations; ** Professional (technical) education institutions only

In Tables 8 and 9, the information generated in Tables 4, 5, 6 and 7 is used to derive estimates of the percentage of family education expenses covered by subsidies across family expenditure quintiles. In both the cases of public and private school attendance, there is a clear tendency for the share of family education expenditure covered by subsidy to decline as one goes to higher family expenditure quintile. The subsidy system, therefore, seems to be progressive, and more so for private schools. In public schools, almost all household education expenditure per child by families in the lowest quintile is covered by subsidies, compared to a subsidy/expenditure ratio of 42 percent for families in the highest quintile. In private schools, the subsidy/expenditure ratio is 81 percent for families in the lowest quintile, compared to only 22 percent for families in the highest quintile. Nevertheless, this does not change the finding (Tables 4, 5, 6 and 7) that the more well off families (which spent much more on education of children) still receive a disproportionately large share of subsidy money, especially in the case of public school attendance. The fact that well to do families benefit from subsidies seems to relate to the system of allocating subsidies. At the primary level, the subsidy is linked to tuition fees

charged by the school (the higher the fee, the lower the subsidy per pupil) and not ability to pay. At the secondary level, the government sponsors students to attend secondary schools. There could be several criteria for selecting students for sponsorship; it seems that family income is not the major consideration, allowing a substantial number of children of well to do families to be sponsored.

Table 8: Percent of family education expenses per child covered by subsidy (subsidy/expenses ratio), by total family expenditure quintile and level of education (public schools only)

Quintile	Primary	Secondary	Tertiary	All levels
1st	98	103*	76	98
2nd	57	76	210*	67
3rd	89	56	120*	83
4th	45	60	118*	60
5th	56	36	37	42
All	54	43	58	51

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages
* In these cases the reported subsidy amount received exceeds the reported amount spent by the family on children's education; furthermore some of the tertiary education quintiles the cell size is less than 5

Table 9: Percent of family education expenses per child covered by subsidy (subsidy/expenses ratio), by total family expenditure quintile and level of education (private schools only)

Quintile	Primary	Secondary	Tertiary	All levels
1st	80	80	37	81
2nd	69	112*	63	82
3rd	47	29	-	37
4th	27	60	53	34
5th	24	20	19	22
All	36	40	25	36

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages
* In theses cases, the reported subsidy amount received exceeds the reported amount spent by the family on children's education; furthermore some of the tertiary education quintiles the cell size is less than 5

Table 10: Percent of family education expenses per child+ covered by subsidy (subsidy/expenses ratio), by total family expenditure quintile and level of education (public schools only)

Quintile	Primary	Secondary	Tertiary	All levels
1st	79	58	78	75
2nd	66	88	301*	75
3rd	62	53	170*	67
4th	42	58	59	49
5th	68	56	62	66
All	64	64	92	67
N	324	143	45	512

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages

+ The above was calculated using survey information on school expenses, namely answers to questions: *"How many persons in all were covered by last school year's school expenses?", "Were some of these expenses borne partly or fully by any other person, your employer, the state (including student grants)?* and *"What is the total amount of this aid?"* * In these cases, the reported subsidy amount received exceeds the reported amount spent by the family on children's education and some of the tertiary education quintiles the cell size is less than 5

Table 11: Percent of family education expenses per child+ covered by subsidy (subsidy/expenses ratio), by total family expenditure quintile and level of education (private schools only)

Quintile	Primary	Secondary	Tertiary	All levels
1st	115*	34	37	85
2nd	52	57	90	59
3rd	48	73	-	59
4th	40	44	48	44
5th	16	17	31	17
All	58	45	53	53
N	41	28	11	80

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages

+ The above was calculated using survey information on school expenses, namely answers to questions: *"How many persons in all were covered by last school year's school expenses?", "Were some of these expenses borne partly or fully by any other person, your employer, the state (including student grants)?* and *"What is the total amount of this aid?"* * In these cases, the reported subsidy amount received exceeds the reported amount spent by the family on children's education; furthermore some of the tertiary education quintiles the cell size is less than 5

An alternative calculation of the subsidy/expenses ratio is presented in Tables 10 and 11 by using the information on the total household education expenses, the total subsidy received by the family for all the members going to school and number of members covered by the school

expenses. Here also one observes a progressive decline in the proportion of family education expenses covered by subsidies as one goes to higher family expenditure quintiles, more so in the case of private school attendance. The results are qualitatively very similar to those presented in Tables 8 and 9.

School enrollment rates in Côte d'Ivoire increase moderately as one goes to successively higher household expenditure quintiles. Male enrollment rates are significantly higher than female enrollments (61 percent compared to 51 percent) and enrollments in urban areas are significantly higher than enrollments in rural areas (65 percent compared to 49 percent). Children who attend private schools, typically, come from more affluent households; poorer households spend, on average, less than half on educating their children, compared to more affluent households. On the other hand, although the mean dollar amount education subsidy per child is higher for children in private schools, 80 percent of education expenses per child going to a public school are covered by subsidies compared to 57 percent for children going to private schools (Table 3).

Comparing subsidies by household expenditure quintiles, dollar amount subsidies increase as one goes to higher expenditure quintiles, however, this increase is much less pronounced in the case of private school attendance. Comparing the proportion of household education expenses covered by subsidies by quintile, permits the conclusion that the subsidy system is progressive, as the subsidy/expenses ratio continuously declines as the household purchasing power increases and more so in the case of private school attendance. The progressivity of the system non-withstanding, the fact that well to do families benefit from

subsidies seems to relate to the system of allocating subsidies. At the primary level, the subsidy is linked to tuition fees charged by the school (the higher the fee, the lower the subsidy per pupil) and not ability to pay; on the other hand, at the secondary level, the government sponsors students to attend secondary schools. As a result, a substantial number of well to do families are sponsored.

Overall, while the existing system of public support to the private education sector plays an important role in maintaining the stability of the education system, further adjustments are needed to better direct decisions on distributing funds and encouraging the development investments in private provision of education in Côte d'Ivoire. In particular, criteria for access to funding need to be refined, so that participation of children from less well to do families is widened. This should be accompanied by stricter pupil performance criteria, linking funding to minimum performance and age limits by education level and cycle.

Determinants of School Choice

In enrolling their children in private rather than public schools, parents presumably believe that the additional cost, primarily in the form of higher fees, is outweighed by educational, social and other benefits of private schooling. For example, private primary and secondary schools tend to enroll a larger proportion of their students in academic programs rather than vocational and general programs; as a result parents may expect that this will help their children get into college. Furthermore, while public schools claim that they provide schooling that incorporates a secular set of values and knowledge, private schools project certain educational ideologies, thus attracting parents who agree with these ideologies (Chiswick and Koutroumanes 1996). Finally, the screening of students in certain private schools, especially in

urban areas, allows for a more homogeneous student body in terms of social background, religion and other characteristics, something which is valued by many families. In contrast, public schools tend to admit a heterogeneous group of students from different socioeconomic backgrounds, religions and values.

Looking at the relative efficiency of private versus public schools in Côte d'Ivoire, using school repetition as a criterion, private religious schools exhibit the highest efficiency, followed by public schools, while private secular schools have the highest repletion rates. For example, at the primary level, 88 percent of pupils in private religious schools complete primary school without repeating a school year, compared to 66 percent in public and 56 percent in private secular schools. At the secondary level (1st cycle), the corresponding figures are 61 percent for private religious schools, 29 percent for public schools and 24 percent for private secular schools (ROCARE 2003).

Pupils in private schools, besides coming from a more educated and affluent background compared to pupils in public schools, have parents who show more active interest in their children's schooling. For example, 66 percent of parents of children in private religious schools participate often or always in school meetings, compared to 34 percent of parents of children in private secular schools and 28 percent of parents of children in public schools.

In the analysis below, it is hypothesized and tested that economic incentives influence the choice between private and public school. Economic theory suggests that the most important determinants of demand for private schooling are income and price. In particular, assuming that

schooling is a normal good, an increase in family income is expected to increase the demand for schooling, including its quality, for any given price of schooling. Other potentially important determinants are various characteristics of the parents, especially the head of the family, such as religious affiliation, level of education and their own education experience; in particular, it is expected that when parents have attended private schools there is a higher probability that children will be enrolled in private schools.

In general, the theoretical demand equation for private schooling is as follows:

$$SCHOOL_{(private=1)} = f(Y, P, UR, RLGN, FEDUC, MEDUC),$$
$$(+)\ (+)\ (-)\quad (+)\quad (+)\quad (+)$$

where Y stands for family income (or expenditure), P for the cost of schooling, UR for urbanity, RLGN for religion (in this case, having Christianity as religion, hence a positive sign is expected), FEDUC and MEDUC for father's education and mother's education.

Ideally, the price variable should be the tuition charges of each school attended by the pupil. The data available contain information on tuition fees paid as reported by the respondent. This is not a proper price variable and if used would result in a strong positive association, simply reflecting the fact that those who attend private schools pay higher fees. The survey did not contain information on the fees charged by the school the child was attending (or which school the child attended).[1]

[1] An attempt at using an imperfect substitute for a price variable was made – namely the difference in the average cost of schooling between private and public schools across 59 communities in Côte d'Ivoire. The coefficient, however, was clearly insignificant in the case of all children attending school, while in the case of children receiving subsidies, it had the correct sign (negative), but it was significant only at the 25 percent level.

The results from OLS and probit models for the probability of a child attending a private school versus a public school are presented below, for all children attending school in 1997-98 (Table 12) and for children attending school in 1997-98 and receiving subsidies (Table 13).

Table 12: Determinants of school choice, all children attending school in 1997-98
Dependent variable: probability of attending private school

Variable	OLS Coefficient (t-value)	Probit Marginal Prob* (z-value)
Total Household Expenditure	3.77e-08 (12.61)	2.12e-08 (9.45)
Christian (omitted: other)	0.014 (1.61)	0.017 (2.09)
Urban area (omitted: rural)	0.620 (7.00)	0.076 (8.39)
Head attended private school) (omitted: head attended public school)	0.187 (9.84)	0.149 (7.65)
Education of head:		
Secondary	0.0154 (1.58)	0.025 (2.67)
Tertiary (omitted: less than secondary)	0.083 (4.55)	0.067 (3.88)
Constant	-0.013 (1.64)	-
N	5,107	5,107
R-sq adjusted (or Pseudo R^2)	0.108	0.132
Observed/Predicted prob.		observed: 0.108 predicted: 0.084

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages
Note: dF/dX is for discrete change of dummy variable from 0 to 1

In the case of Côte d'Ivoire, instead of the potentially under-reported family income, total household expenditure was used. After experimentation, the model includes five explanatory variables, namely total family expenditure, urban/rural residence, head having attended private/public school, and head's level education, one dummy for Christian affiliation and the differences in education cost between private and public schools. The most important determinants of private school choice are the income variable (in our case annual household

expenditure), the head having attended a private school and living in an urban area. Furthermore, the higher the level of education of the head of family, the higher the probability that the child is enrolled in a private school.

The results from the two samples (all children in school and children receiving an education subsidy) are very similar to one another. This is evident from inspecting the coefficient estimates from the OLS and probit (where coefficients measures the marginal effects).

Table 13: Determinants of school choice, all children benefiting from subsidies: Dependent variable: probability of attending private school

Variable**	OLS Coefficient (t-value)	Probit Marginal Prob* (z-value)
Total Family Expenditure	2.68e-08 (3.43)	1.89e-08 (2.90)
Christian (omitted: other)	0.016 (0.76)	0.019 (0.86)
Urban area (omitted: rural)	0.081 (3.43)	0.094 (3.92)
Head attended private school) (omitted: head attended public)	0.202 (4.74)	0.170 (3.81)
Education of head: Tertiary (omitted: less than tertiary)	0.123 (2.55)	0.097 (2.08)
Constant	0.015 (0.69)	-
N	973	973
R-sq adjusted (or Pseudo R^2)	0.088	0.102
Observed/Predicted prob.		observed: 0.137 predicted: 0.115

Source: Own calculations using the 1998 Enquête Niveau de Vie des Ménages
* dF/dX is for discrete change of dummy variable from 0 to 1; ** The sample of children receiving subsidies was too small to support the creation of an education cost proxy

One question that can be raised in relation to the above estimated models has to do with sample selection bias; that is the possibility that there may be variables which could influence the decision to attend private school, but which may also affect education outcomes (such as distance to school and religion). In detecting sample selection bias and correcting for it, a

Heckman correction for the probit estimates is used (Heckman 1979).

The probit model with sample selection assumes that there exists an underlying relationship:

$$y^*_j = x_j\beta + u_{ij} \qquad \text{(latent equation)}$$

such that we observe only the binary outcome:

$$y_j^{probit} = (y^*_j > 0) \qquad \text{(probit equation).}$$

The dependent variable, however, is not always observed. Rather, the dependent variable for observation j is observed if

$$y_j^{select} = (z_j\gamma + u_{2j} > 0) \quad \text{(selection equation)}$$

where, $u_1 \sim N(0, 1)$

$u_2 \sim N(0, 1)$

$corr(u_1, u_2) = \rho$.

When $\rho \neq 0$, standard probit techniques applied to the first equation yield biased results. Estimation using the Heckman correction for probit yields consistent, asymptotically efficient estimates for the model parameters.

One observes whether children attend private school only if the child is attending school (in 1997-98). In estimating the Heckman-corrected-model, the regressors used in the selection equation (dependent variable: binary variable taking the value of 1 if child attended school in 1997-98 and 0 otherwise) and found statistically significant were: family expenditure (in place of family income), sex of child, two education dummies for head of household, two education dummies for the spouse of the head of family and one religion dummy.

In this case, after testing for $\rho = 0$ vs. $\rho \neq 0$, it is concluded that $\rho = 0$ (p-value for the chi-square test was about 0.25). This is the result of a likelihood-ratio test, by comparing the likelihood of the full model with the sum of the log-likelihoods for the probit and selection models. Therefore, there is no evidence of sample selection and one can use the results from the simple probit model.

The absence of a suitable cost of schooling (price) variable, impairs the results obtained from the demand for private schooling analysis. It is, however, found that the higher the household purchasing power, the father having attended a private school and the higher the education level of the father, significantly increases the probability of a child attending a private school.

Conclusions

For both public and private schools, the subsidy amount per student increases steadily as one goes to higher expenditure quintiles. In the case of public schools, students from families in the highest quintile receive four times more than families in the lowest quintile. For those attending private schools, the subsidy per student increases, but the increase is less pronounced. Students from families in the highest expenditure quintile receive just over twice the subsidy received by students from families in the lowest quintile. Overall, the allocation of subsidies seems to be more equitable in the case of children attending private schools compared to those attending public schools.

Looking at estimates of the percentage of family education expenses covered by subsidies across family expenditure quintiles revealed that, in both the cases of public and private school attendance, there is a clear tendency for the share of family education expenditure covered by subsidies to decline as one goes to higher family expenditure quintile. This decline, however, is significantly more pronounced in the case of private schools. The subsidy system, therefore, seems to be progressive, and more so for private schools.

A demand equation for private school attendance (probability of a child attending a private school versus a public school in 1997-98) was estimated by testing the hypothesis that economic incentives influence the choice between private and public school, using OLS and probit model specifications. The most important determinants of private school choice are the income variable (in our case annual household expenditure), the head having attended a private school and living in an urban area. Furthermore, the higher the level of education of the head of family, the higher the probability that the child is enrolled in a private school.

Finally, on a different note, one can draw attention to the issue of sensitivity of private to public enrollment in relation to government interventions in the education sector. One can be fairly certain that the overall education sector in Côte d'Ivoire will be growing to improve access to education. One way to effect such growth is by providing more public school places. However, once there is an active private sector already in place, which provides a viable alternative to the public education sector, a (possibly) strong substitution effect may be present which wound impede the efficiency gain from government intervention; this is because the public expansion may, partially, crowd out students who would have gone to private schools.

Jimenez and Sawada (2001) find a substantial crowding-out effect in the case of the Philippines. Therefore, one must look beyond the public sector. Côte d'Ivoire provides an example of a country where the private sector can be utilized to achieve better delivery of public services. The key is to align the subsidy allocation system – the funding formula – with household income of subsidy recipients so that the poor will have better access to quality education services.

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